AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

1. (Original) A throttle area compensation system for use with an electronic throttle control of a vehicle, comprising:

a compensation datastore of compensation values indexed by pre-compensated throttle area;

a compensation vector learning module receiving a pre-compensated throttle area and at least one sensed vehicle condition, and informing the compensation datastore based on the pre-compensated throttle area and the sensed vehicle condition; and

a throttle area compensation module communicating with the compensation datastore, receiving the pre-compensated throttle area, and determining a compensated throttle area based on the pre-compensated throttle area and a corresponding compensation value of the compensation data store.

2. (Original) The system of claim 1, wherein said compensation vector learning module includes an ideal airflow rate calculation module determining an ideal airflow rate based on the pre-compensated throttle area, and an airflow rate comparison module determining a residual airflow rate based on the ideal airflow rate and a sensed airflow rate of the vehicle.

3. (Original) The system of claim 2, wherein the compensation vector learning module includes a compensation vector development module at least one of:

limiting the residual airflow rate to prevent overcompensation of the pre-compensated throttle area; and

averaging a predetermined number of previously generated residual airflow rates stored in memory with the residual airflow rate to improve accuracy and reduce variation in throttle are compensation.

4. (Original) The system of claim 3, wherein said compensation vector development module determines an upper rate limit corresponding to the pre-compensated throttle area and a lower rate limit corresponding to the pre-compensated throttle area, rate limits the residual airflow rate by replacing the residual airflow rate with the upper rate limit in the event the residual airflow rate exceeds the upper rate limit, and by replacing the residual airflow rate with the lower rate limit in the event the lower rate limit exceeds the residual airflow rate.

5. (Original) The system of claim 3, wherein said vector compensation module retrieves neighboring compensation values from memory that neighbor the pre-compensated throttle area, determines an upper rate limit and a lower rate limit based on the neighboring compensation values and predetermined range modifiers, and limits the residual airflow rate by replacing the residual airflow rate with the upper rate limit in the event the residual airflow rate exceeds the upper rate limit, and by replacing the residual airflow rate with the lower rate limit in the event the lower rate limit exceeds the residual airflow rate.

6. (Original) The system of claim 2, wherein said compensation vector learning module includes a compensation vector development module receiving the residual airflow rate and the pre-compensated throttle area, determining a new compensation value based on the residual airflow rate and an old compensation value of the compensation datastore corresponding to the pre-compensated throttle area, and recording the new compensation value in the compensation datastore in correspondence with the pre-compensated throttle area.

7. (Original) The system of claim 1, wherein said compensation vector learning module includes a learning conditions enforcement module receiving at least one of the pre-compensated throttle area, the plurality of sensed vehicle conditions, and a time-dependent input, and preventing said compensation vector learning module from informing said compensation datastore if predetermined learning conditions are not deemed met based on at least one of the pre-compensated throttle area, the plurality of sensed vehicle conditions, and the time-dependent input.

8. (Original) The system of claim 7, wherein said learning conditions enforcement module prevents said compensation vector learning module from informing said compensation datastore if at least one of:

a vehicle operation fault is detected;

airflow rate is not stable in accordance with predetermined criteria;

engine speed is not within a predetermined range;

sensed vehicle operating conditions have not been sensed recently;

sensed airflow rate does not correlate with sensed air pressure;

engine idle is not within a predetermined range;

a sufficient amount of time has not passed since a last learning cycle;

a change in throttle position is not within a predetermined range; and

pre-compensated throttle area is not within a predetermined range.

9. (Original) The system of claim 1, comprising a throttle position determination module communicating with a throttle position datastore of throttle positions indexed by throttle area, receiving the compensated throttle area, and determining a throttle position based on the compensated throttle area.

10. (Original) The system of claim 1, comprising a throttle area determination module receiving a commanded engine speed and a plurality of sensed vehicle conditions, and determining the pre-compensated throttle area based on the commanded engine speed and the plurality of sensed vehicle conditions.

11. (Original) The system of claim 1, comprising a throttle control module receiving the throttle position, and controlling a throttle of a vehicle producing the sensed vehicle conditions based on the throttle position.

12. (Original) The system of claim 1, comprising a data validation module evaluating the compensation values of said compensation datastore to determine whether the compensation values are valid, and reinitializing said compensation datastore if the compensation values are not determined to be valid.

13. (Original) The system of claim 12, wherein said data validation module determines whether neighboring compensation values exhibit a slope that falls within a predetermined range, and determines whether individual compensation values fall within a predetermined range.

14. (Original) The system of claim 12, wherein said data validation module sets a diagnostic flag indicative of a defect in said compensation datastore based on whether the compensation values are determined to be valid.

15. (Original) A throttle area compensation method for use with an electronic throttle control of a vehicle, comprising:

calculating an ideal airflow rate based on a pre-compensated throttle area;

determining a residual airflow rate based on a comparison between the ideal airflow rate and an actual airflow rate of the vehicle; and

compensating pre-compensated throttle area based on the residual airflow rate.

16. (Original) The method of claim 15, wherein said step of compensating pre-compensated throttle area includes compensating the pre-compensated throttle area based on a compensation value associated in memory with the pre-compensated throttle area, the method further comprising a learning step including:

generating a new compensation value based on the residual airflow rate and an old compensation value associated in memory with the pre-compensated throttle area; and

replacing the old compensation value by associating the new compensation value in memory with the pre-compensated throttle area.

17. (Original) The method of claim 16, comprising:

determining whether predetermined learning conditions have been met based on at least one of sensed vehicle conditions, the pre-compensated throttle area, and a time-dependent input; and

preventing said learning step from occurring if the predetermined learning conditions have not been met.

18. (Original) The method of claim 17, wherein said step of determining whether predetermined learning conditions have been met includes at least one of:

determining that a vehicle operation fault is not detected;

determining whether airflow rate is stable in accordance with predetermined criteria;

determining whether engine speed is within a predetermined range;

determining whether the sensed vehicle operating conditions have been sensed recently;

determining whether sensed airflow rate correlates with sensed air pressure;

determining that engine idle is within a predetermined range;

determining that a sufficient amount of time has passed since a last learning cycle;

determining that a change in throttle position is within a predetermined range; and

determining that the pre-compensated throttle area is within a predetermined range.

19. (Original) The method of claim 15, comprising at least one of:

limiting the residual airflow rate to prevent overcompensation of the pre-compensated throttle area; and

averaging a predetermined number of previously generated residual airflow rates stored in memory with the residual airflow rate to improve accuracy and reduce variation in throttle are compensation.

20. (Original) The method of claim 19, comprising:

determining an upper rate limit corresponding to the pre-compensated throttle area and a lower rate limit corresponding to the pre-compensated throttle area; and

rate limiting the residual airflow rate by replacing the residual airflow rate with the upper rate limit in the event the residual airflow rate exceeds the upper rate limit, and by replacing the residual airflow rate with the lower rate limit in the event the lower rate limit exceeds the residual airflow rate.

21. (Original) The method of claim 19, comprising:

retrieving neighboring compensation values from memory that neighbor the pre-compensated throttle area;

determining an upper rate limit and a lower rate limit based on the neighboring compensation values and predetermined range modifiers; and

limiting the residual airflow rate by replacing the residual airflow rate with the upper rate limit in the event the residual airflow rate exceeds the upper rate limit, and by replacing the residual airflow rate with the lower rate limit in the event the lower rate limit exceeds the residual airflow rate.

22. (Original) The method of claim 15, comprising:

determining a throttle position based on compensated throttle area; and

controlling a throttle of the vehicle producing the sensed vehicle conditions based on the throttle position.

23. (Original) The method of claim 15, comprising:

sensing the actual airflow rate of the vehicle; and

determining the pre-compensated throttle area based on a commanded engine speed.

24. (Withdrawn) A datastore diagnostic method for use with a vehicle electronic throttle control system, wherein the system compensates throttle area based on compensation values generated from sensed vehicle conditions and stored in a compensation datastore, comprising:

evaluating data useful in vehicle operation and stored in a datastore of a vehicle to determine whether the data is valid; and

reinitializing the datastore based on whether the data is determined to be valid,

wherein said evaluating and said reinitializing are performed substantially immediately before the data is used in vehicle operation.

25. (Withdrawn) The method of claim 24, wherein said evaluating includes:

determining whether neighboring points of the data exhibit a slope that falls within a predetermined range; and

determining whether individual points of the data have values falling within a predetermined range.

26. (Withdrawn) The method of claim 24, comprising setting a diagnostic flag indicative of a defect in the datastore based on whether the data is determined to be valid.